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Evaluation of attitudes, behaviors and knowledge levels of students of functional foods

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ABSTRACT

Aims: This study aimed to determine the knowledge level of students studying functional foods at a public university in Malatya and to evaluate the factors affecting their attitudes and behaviors.

Methods: A total of 618 individuals (363 female and 255 male) studying at universities in Malatya were included in this study. Data were collected using a face-to-face survey. The questionnaire consisted of questions about demographic characteristics, eating habits, general health, anthropometric measurements (body weight and height), functional food knowledge level, and food preference scale sections. The data were analyzed using SPSS.

Results: The mean age of the participants was 24.45±2.18 years. It was determined that 65.04% of the individuals had heard of the term functional food. The YETBID-Basic Nutritional Knowledge Scores were higher in females (54.66±8.85) than males (51.14±8.22) (p=0.031). Individuals' knowledge attitude scale confidence subheading score for functional foods was higher in female (3.95±1.04) than in male (3.15±1.04) (p=0.044). It was observed that as the basic nutrition score increased in both female and male, the score on the attitude scale towards functional foods also increased. In the multiple regression analysis, it was determined that the total score of the attitude scale towards functional foods was significantly affected by the variables of female (sex), duration of education, basic nutrition score, and food preference score (p<0.05).

Conclusion: It was determined that as the education level of the individuals increased, their level of basic nutrition knowledge increased, which affected their attitude towards functional foods. It has been determined that female have higher nutritional knowledge levels than male, find functional foods more reliable, and are more inclined to consume them.

Keywords: Nutrition, knowledge level, functional foods

INTRODUCTION

Over the years, functional foods have been the focus of numerous studies, particularly in the fields of technology and better nutritional health.[1] No single definition of functional foods exists.[2] More than 100 experts in nutrition and related fields came to an agreement on the definition of functional nutrients between 1995 and 1998 as part of the European Commission's coordinated action on functional nutritional science, coordinated by the International Life Sciences Institute.[2] A nutrient can be deemed functional if, in addition to the benefits of adequate nutrition, it has been satisfactorily demonstrated to positively affect one or more target bodily functions, either by enhancing health or well-being and/or lowering the risk of disease. In earlier studies, it was the definition of a functional nutrient that was most frequently cited.[3]

People are becoming more and more aware of the nutritional value and health advantages of various foods as functional foods gain popularity.[4] As a result, there has been a significant rise in both consumer interest in and demand for healthy food products. To satisfy these demands, it is necessary to create new functional foods.[5] However, the creation of functional foods is not only a time-consuming, expensive, and uncertain process that depends on a variety of factors for consumer acceptance of foods. New functional foods may not be well-received by consumers due to their skepticism and uncertainty. Understanding consumer reactions to functional foods is crucial because it influences their consumability.[6]

The factors that can predict consumer acceptance of functional foods have been the subject of numerous studies, and a wide range of significant factors have been identified.[7,8] However, it has proven challenging to clearly and completely understand the factors influencing consumer acceptance due to studies carried out in various contexts. It is challenging to pinpoint broad trends

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that will aid researchers and functional food producers when creating and introducing functional foods due to the complexity of the interrelationships between the various factors and their diversity.[9] The functional foods industry's communication and marketing professionals are working with a wide range of influencing factors to develop precise communication strategies that will increase consumer acceptance of functional foods.[10]

The purpose of this study was to ascertain the functional food knowledge levels of students attending a public university in Malatya and to assess the variables influencing their attitudes and behaviors.

METHODS

The study was carried out with the permission of Malatya Turgut Özal University, Non-interventional Clinical Researches Ethics Committee (Date: 12.01.2022, Decision No: 2022/15-24). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Individuals And Ethical Procedures

This case study was cross-sectional in nature. Prior to gathering data, the non-interventional research ethics committee granted its approval. A face-to-face questionnaire was used to gather research data. The participants were informed of the study's goals and specifics prior to the survey, and their written consent was obtained. In this study, research was done from March to May 2022.

Sample Of The Study

Using G-Power 2.19, the power analysis for this study was carried out. According to the power analysis, 578 people should be included in the study because the 'critical F' value was calculated to be 2.63 with 90% power, an effect size of 0.3, and a margin of error of 0.05.

Participants in this study were undergraduate students at two universities in southern Turkey. The study included university students who were between the ages of 18 and 65 and did not have any communication issues.

Data Collection Tool

The information collection form used in the research included questions about demographic characteristics, nutritional habits, general health status, anthropometric measurements (body weight and height), functional food knowledge level, and food preference scales.

Anthropometric Measurements

Body weight and height measurements of all individuals participating in the study were obtained by the researchers. Body weight of the individuals was measured with a portable scale (Tanita-HA-622) sensitive to 1 kg, in light clothing and without shoes, in accordance with the method. The distance was measured in centimeters (cm) with a non-stretchable measuring tape.

Body mass index: Body mass index (BMI) was determined by dividing the individual's body weight in kilograms by the square of the individual's height in meters. BMI classifications include underweight if an individual's BMI is less than 18.5 kg/m², normal weight if between 18.5 and 24.9 kg/m², overweight if BMI is between 25.0 and 29.9 kg/m², and. If BMI is more than 30.0 kg/m², it is considered as obese.[11]

Functional Foods Knowledge Level and Food Preference Scales

The research data were collected through face-to-face interviews with volunteers using an information collection form. In addition, the Functional Food Attitude Scale, which was developed by Urala and Lahteenmaki (2007) and adapted in Turkish by Hacıoğlu and Kurt[12] (2015), was used to measure the attitudes of the individuals participating in the study towards functional foods. This scale consists of 25 items in total and includes variables such as benefit, necessity, trust, and security. The statements on the scale were evaluated using a five-point Likert 5-point scale.

In 2018, Batmaz[13] established the accuracy and reliability of this scale. The adult nutrition knowledge level (YETBID)'s "Basic nutrition" section had a Cronbach's Alpha reliability coefficient of 0.81 while the "Nutrition preference" section had a Cronbach's Alpha reliability coefficient of 0.78. Following a visual analog scale (VAS) that rates the relationship between nutrition and health, the scale's first section contains 20 propositions on a 5-point Likert scale that probe participants' fundamental understanding of nutrition and the connection between food and health. The basic nutrition section earned the highest score of 80 points, and the food preference section earned the second-highest score of 48 points. Table 1 lists the food preference scale's evaluation standards.

Table 1. Evaluation criteria of the basic nutrition and food preference scale

Point range	Classification
Basic Nutrition Score	
<45 points	Bad
46-55 points	Middle
56-65 points	Good
>66 points	Very good
Food Preference Score	
<30 points 'bad' knowledge	Bad food preference
30-36 points 'middle' knowledge	Middle food preference
37-42 points 'intermediate' knowledge	Good food preference
>42 points 'very good' knowledge	Very good food preference

Statistical Analysis

IBM SPSS 22.0 package program was used for data analysis. Continuous variables were evaluated using mean and standard deviation. The χ^2 test was used to compare the means of more than two groups, the Mann-Whitney U test was used to compare the means of independent variables belonging to two groups, and the Wilcoxon signed-rank test was used to compare the means of dependent variables within the group. Spearman's correlation analysis was performed to describe the relationships between variables.

RESULTS

The demographic characteristics of the participants are presented in Table 2. A total of 618 students, aged between 18 and 48 years, were included in the study. Of the individuals, 35.76% were associate degree students, 35.92% lived in dormitories, 18.12% had an active working life, 39.16% smoked, 89.64% did not have any disease, and most earned a minimum wage and monthly income. It was stated that 69.90% of the individuals did not engage in any physical activity regularly. Within the scope of the study, 65.04% of the individuals declared that they had heard of the term Functional Nutrient.

The average YETBID scores of individuals by gender are shown in Table 3. According to the sub-headings of the individuals' knowledge attitude scale for functional foods, the highest sub-heading score of male individuals was in the "benefit" subheading (3.16±1.01), while the female were in the "confidence" subheading (3.95±1.04). When the differences between the averages between male and female were examined, it was observed that the difference in scores between the "confidence" subheading was statistically significant (p=0.044). According to the YETBID-Basic Nutrition Knowledge Score, female had higher mean scores than male, and this difference was statistically significant (p =0.013).

A comparison of the mean scores of the attitude scale towards functional foods according to the eating attitude scale score according to gender is given in Table 4. It was observed that as the basic nutrition score increased in both female and male, the score of the attitude scale towards functional foods also increased. It was determined that individuals with good basic nutrition scores had different attitudes towards functional foods according to sex, and this difference was statistically significant (p=0.035). An increase in the basic nutrition score in female increased the attitude score towards functional foods. The value which was 3.89±1.01 points in female was found as 3.04±0.23 in male. According to food preference scores, there was no difference between the scores of individuals whose attitudes towards functional foods were examined according to gender. In general, an increase in the food preference score in both gender also increased the taste score for functional foods.

Table 2. Demographic characteristics of the participants

	n=618	%
Age(mean±SD)(Years)	24.45±2.18	
Gender		
Female	363	58.74
Male	255	41.26
Education Degree		
Associate degree (2 years and below)	221	35.76
Undergraduate (4 years and below)	240	38.83
Master	102	16.50
Doctorate	55	8.90
Where and with he/she lives?		
At home with his family	210	33.98
At home with friends	186	30.10
In the dormitory	222	35.92
Working status		
Yes	112	18.12
No	506	81.88
Smoking		
Yes	242	39.16
No	376	60.84
Monthly income		
1/3 of the minimum wage	312	50.49
½ of the minimum wage	245	39.64
Minimum wage	31	5.02
Above minimum wage	30	4.85
Physical activity habit		
Yes	186	30.10
No	432	69.90
Physical frequency per week		
2 Days a Week	64	10.36
3 Days a Week	55	8.90
3 Days A Week And More	67	10.84
Have you heard the term functional food before?		
Yes	402	65.04
No	216	34.96

**More than one answer was received.

Table 3. Comparison of individuals' attitude scale towards functional foods and YETBID scale Means according to gender

	Male	Female	p*
	$\bar{x}$±SD	$\bar{x}$±SD	
Attitude scale towards functional foods			
Use	3.16±1.01	3.36±1.03	0.309
Necessity	2.19±0.64	2.09±0.68	0.204
Trust	3.15±1.04	3.95±1.04	0.044
Security	2.94±0.68	2.25±0.67	0.103
Total	3.11±0.59	3.01±0.52	0.905
YETBID-Basic nutrition knowledge score	51.14±8.22	54.66±8.85	0.031
YETBID-Nutrition and health relationship VAS scale score	8.03±2.09	8.99±6.04	0.667
YETBID- Food preference score	35.06±5.70	36.24±6.09	0.119
YETBID-Food preference VAS scale score	6.26±2.24	6.56±1.830	0.702

*Mann Whitney U Test

Table 4. Comparison of the mean scores of the attitude scale towards functional foods according to the eating attitude scale score

	Attitude scale score towards functional foods		p*
Basic Nutrition Score	**Male** $\bar{x}$±SD	**Female** $\bar{x}$±SD	
<45 points	2.14±1.01	2.66±0.66	0.201
46-55 points	2.56±0.65	2.55±0.99	0.398
56-65 points	3.04±0.23	3.89±1.01	0.035
>66 points	3.15±0.94	3.21±1.06	0.417
Food Preference Score			
<30 points 'bad' knowledge	2.99±0.86	2.88±0.55	0.310
30-36 points 'middle' knowledge	2.85±.0.81	2.91±0.85	0.701
37-42 points 'intermediate' knowledge	3.55±1.21	3.11±1.01	0.205
>42 points 'very good' knowledge	3.01±1.09	2.99±1.04	0.201

*Mann Whitney U Test

Multiple linear regression analysis was performed to estimate the total scale score based on sex, educational status (based on education period), basic nutrition score, and food preference score (F=29,509, p<0.001). All the variables together explained 46% of the variance in the total score. Gender, education level (according to education period), basic nutrition score, and food preference score affected the total score of the scale (p<0.05).

DISCUSSION

Functional foods have been shown to protect against many diseases, such as cardiovascular diseases, diseases related to the gastrointestinal system, diabetes, and cancer, and can be used in the treatment of diseases.[14,15]It has been reported that the demand for functional foods has increased in recent years. The reason for this situation stems from individuals' perceptions, attitudes and behaviors towards functional food.[16,17]

College years are a crucial time to prepare young people for adulthood. During this period, it is important to increase awareness of healthy nutrition in young people and to gain life skills to prevent diseases. This study aimed to evaluate the knowledge, attitudes, and behaviors of university students regarding functional foods.

The education level of the students and the social environment they stay in significantly affects their eating habits. In this study, it was observed that the majority of students received education at the associate degree level and stayed in the dormitory. It is known that there is a relationship between individuals' incomes and eating behaviors. There is a linear relationship between personal disposable income and nutrition.[18] It is seen that the majority of the individuals participating in this study have an income equal to half of the minimum wage. The fact that university students left home during this period changed their eating habits. In particular, poor eating habits, such as skipping meals, eating out more often, snacking, and getting most of their nutrition from fast food, are observed.[19,20] It was determined that the individuals participating in this study had two main meals a day and skipped lunch the most often. In addition, the majority of individuals do not have a smoking habit. The majority of individuals participating in the study did not have a chronic disease that would affect their nutritional status. Physical activity plays an important role in the prevention of chronic diseases and the development of physical and mental health. In this study, the majority of the students reported that they engaged in physical activity two or three days a week.

Studies show that people who understand the concept of functional food and have knowledge of it consume these nutrients at a higher rate.[21,22] However, individuals' views on functional foods are not greatly affected by vocabulary.[23] The majority (64%) of the individuals participating in this study were university students who had heard of functional foods before. Another study conducted with university students showed that knowing functional foods, their previous use and monthly income affect attitudes towards these foods.[24] A study conducted in Italy showed that people do not have sufficient knowledge about functional foods, 20% of the participants mix functional foods with diet and light products, 24% cannot define functional foods, and 16% incorrectly associate foods with health.[25] In a study conducted with 1039 individuals aged between 14 and 30 years in Croatia, it was reported that 66.60% of the youth were not familiar with the concept of functional foods.[26]

Table 5. Multiple regression analysis of gender, education level, BMI, basic nutrition score and food preference score factors affecting the total score of the attitude scale towards functional foods

Model	B	Beta	Standart error	p<0.05	95.0% CI		F	R	R^2
					Lower bound	Upper bound			
Constantly	104.214		24.327	.000	90.489	106.940			
Gender(ref. Male)	1.781	-.239	0.181	.000	1.252	3.311			
Educational status (according to education period)	2.279	-.165	0.572	.000	1.545	3.014	29.509	0.678	0.461
Basic Nutrition Score	2.152	.174	1.058	.002	1.129	5.175			
Food Preference Score	1.377	.066	0.164	.031	0.533	2.222			

CI: Confidence Interval, Ref.:reference

Consumption and awareness of functional foods are affected by education level.[24] Similarly, in this study, it was determined that the increase in the education period of individuals affected the total score of the attitude scale towards functional foods ($p<0.05$).

In studies examining attitudes towards functional foods; In a study conducted with Swedish consumers on the necessity of functional foods, the participants defined functional foods as unnatural foods, therefore they stated that they did not need functional foods. However, they stated that these nutrients can be used if a healthy lifestyle is insufficient to improve health status.[27] In another study, it was determined that people's attitudes towards functional foods, because they find these foods unnecessary, and their beliefs cause distrust towards these foods.[26] In a study conducted with students studying health sciences in Turkey, it was claimed that female found functional nutrients more reliable and important than men.[28] Similarly, in another study, it was determined that female were more agreeable than male about the utility and necessity of functional nutrients.[29] In this study, it was seen that the highest sub-heading score of the attitude scale score towards functional foods was in the sub-title of benefit for male, and the sub-title of confidence for female. It has been shown that female find functional foods more beneficial for health than male, and female consume functional foods at a higher rate.[29] According to a study on female, improving physical health and reducing fatigue are the main reasons for consuming functional foods.[30] In another study, individuals stated that they consumed functional foods because they thought they were delicious, of good quality, and beneficial to health.[31] In this study, it was observed that as the basic nutrition score increased in both female and male, the score of the attitude scale towards functional foods also increased. The basic nutrition score increased the attitude scale score towards functional foods 2.152 times. On the other hand, the basic nutrition score of female was higher than that of male, and the scores of the attitude scale towards functional foods of female with good nutrition scores were significantly higher than those of male ($p=0.035$). Female's attitudes towards functional foods were 1.781 times higher than male's. In addition, it was observed that the increase in the food preferences of individuals affected the attitude scale score towards functional foods by 1.377 times.

Limitations of the study

The fact that this study was conducted only with university students in the province of Malatya creates a limitation in terms of the generalization of the results. To determine the general situation, it is recommended to conduct multicenter studies with larger sample sizes and to plan training for this.

CONCLUSION

As a result, in this study, it was determined that as the education level of the individuals increased, the level of basic nutrition knowledge increased, which affected their attitude towards functional foods. In addition, it was determined that female's nutritional knowledge levels were higher than those of male, and they were more inclined to consume functional foods. Functional foods have many beneficial health effects. Therefore, it should be ensured that the right information about functional foods is delivered from the right sources. Society should be informed more about functional foods, and strategies should be created to encourage male to understand and consume these foods, especially regarding gender. Healthy nutrition should be evaluated as a whole, the tendency towards a single food group should be prevented, and the importance of appropriate and balanced nutrition from all food groups should be emphasized in order to increase social awareness about functional foods.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Malatya Turgut Özal University, Non-interventional Clinical Researches Ethics Committee (Date: 12.01.2022, Decision No: 2022/15-24).

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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